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## (54) SAFETY HELMET

(71) We, COENEN BENELUX B.V., a body corporate organised according to laws of The Netherlands, of De Gaarde 17, The Hague, The Netherlands, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

The invention relates to crash-helmets comprising an inner shell, an outer shell and a visor.

In case of known safety helmets of this kind the visor consists of a separately manufactured transparent part which is connected to the outer shell either rotatably or not. The outer shell is formed by a tinted hard synthetic resin (e.g. polyethylene or polycarbonate) and extends itself over the whole outer surface of the inner shell. For manufacturing the outer shell a very expensive injection moulding die is required which is assembled from various parts. Normally the outer shells are delivered in a number of various colours. When changing from one colour to the other rather much loss of material arises when injection moulding. To limit these losses greater number of shells (e.g. more than 3000 are made in one colour without interruption. These have to be stored which requires a lot of space.

The invention aims to avoid these disadvantages and to provide a safety helmet of the type mentioned above, in which the visor and the outer shell can be simultaneously manufactured of a transparent synthetic resin in a rather simple injection moulding die.

According to the invention there is provided a safety helmet comprising an inner shell of shock-absorbing material, a protective outer shell made of a hard plastics material, said outer shell surrounding the greater part of the inner shell and having a visor portion, wherein the said outer shell and the said visor portion are formed of a single piece of transparent plastics material, said outer shell being connected to said inner shell by at least one hinge that permits relative movement about an axis that is transverse to the side portion of the helmet.

In a safety helmet with two hinges it is preferred that each of the hinges consists of a pin extending through the outer shell and is connected to a strip that extends through the inner shell, the end of the said strip remote from the sleeve being provided with a fastening member for a chin-strap.

In view of the transparent properties of the outer shell the outer surface of the inner shell which usually consists of foam will usually be provided with a finishing layer. A finishing layer made from nylon flakes can be used in a very simple way according to a method known *per se* in which the inner shell is covered with an electrically charged adhesive and the flakes which are provided with an opposite electrical charge, are attracted to the adhesive layer.

The flakes cover the edges of the inner shell as well so that it is not necessary for the size adjusting lining provided in the inner shell to extend over the edges of the inner shell. It is thus possible to provide very simple size adjusting lining pieces.

The inner surface of the inner shell may be provided with recesses in which size adjusting lining pieces are fastened. This is a not unimportant cost-saving factor.

Now the invention will be further described by way of example only with reference to the accompanying drawings in which:

Fig. 1 is a side view of a safety helmet according to the invention with a chin piece.

Fig. 2 is a side view of a safety helmet according to the invention without a chin piece.

Fig. 3 is a front view of the helmet according to Figure 1 partly in section.

The safety helmets illustrated comprise an inner shell 1 made of a foam of a synthetic resin (e.g. polystyrene), a transparent outer shell 2 of a hard synthetic resin (e.g. polycarbonate) and a visor 3 which forms one piece with the outer shell and is manufactured together with the outer shell of the same material by means of injection moulding.

The unit formed by the outer shell and the visor is connected to the inner shell by means of two hinges 4. The axis of those hinges extend transverse to a side section of the

**I569050 COMPLETE SPECIFICATION**

## COMPLETE SPECIFICATION

**2 SHEETS**

2 SHEETS This drawing is a reproduction of  
the Original on a reduced scale  
Sheet 1

Sheet 1

fig-1

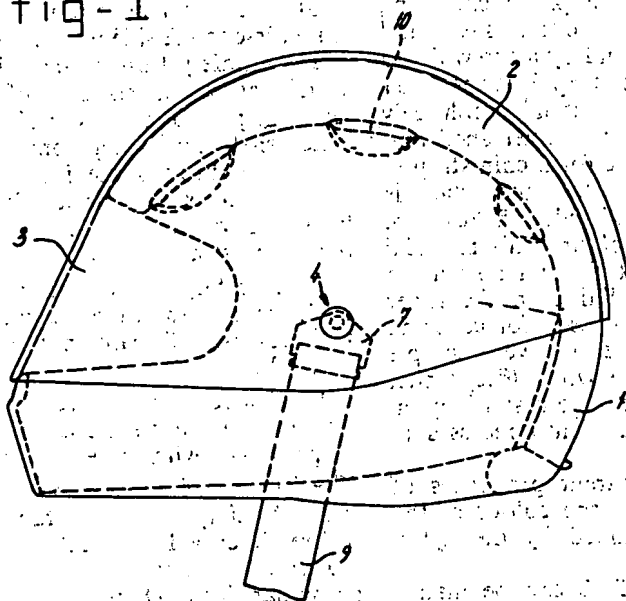


fig-2

